Light used for cancer treatment: CEA-Leti announces TARGET-PDT study aimed at improving photodynamic therapy

I-Micronews

PDT is a minimally invasive treatment that destroys cancer cells with a combination of a photoactive drug known as a photosensitizer and a specific wavelength of light. When the photosensitizers are activated by the laser light, they produce a form of oxygen that destroys illuminated cancer cells.

Focusing on using PDT against bone cancer and head-and-neck squamous cell carcinoma, which is a tumor e.g. of the oral cavity, the project will study the delivery and targeting of photosensitizers encapsulated into lipid nano-particles. For both cancer forms, current treatment regimes often result in low cure rates and show serious side effects or a poor functional outcome. The nano-carriers offer a high payload that will include antibodies targeting specific tumor biomarkers.

PDT has already shown significant potential for improving cancer treatment because it offers strictly focused application, biocompatibility with other forms of treatment, the option for repeated use, excellent cosmetic or functional outcomes and fast recovery. Indeed, typically there is a modest enhanced accumulation of the photosensitizer in tumor tissues and an additional selectivity is mainly provided by the confined illumination of the target area.

But, the use of PDT has been restrained by limited effectiveness of the photosensitizers on reaching the tumor and the potential damage to healthy cells near the tumor. Improved targeting of the photosensitizer and nano-particles is necessary to prevent damage to the surrounding healthy tissue.

CEA-Leti, which is coordinating this European project, expects the nano carrier-based approach will significantly improve delivery and targeting of the photosensitizer, enhancing concentrations at the tumor site even after systemic application.

The TARGET-PDT project will allow the partners to study all aspects of PDT treatment: nano-carrier size and payload, photosensitizers such as chlorines and phthalocyanines, targeting method and types of laser irradiation.

The experimental approach will be developed into a preclinical validation to deliver an optimised combination for first clinical “nano-PDT” at a later stage. By using nanotechnology-based photosensitizer delivery systems, the project will set the stage for improved control of the therapy and more comfort for cancer patients.

About TARGET-PDT
CEA-Leti is coordinating TARGET-PDT as part of its research program on organic

nanocarriers and delivery systems for clinical applications like molecular imaging and drug delivery.
The partnership includes highly complementary partners. In addition to CEA-Leti, they are the European industrial leader in PDT, the German company biolitec AG; University Hospital Zurich, which is recognized for it clinical PDT capabilities; French academic laboratories belonging to the Centre National de la Recherche Scientifique (CNRS) and the Anticancer Research Center; and Centre Alexis Vautrin in Nancy, France, which specializes in PDT from bench to bedside.

About CEA-Leti
CEA is a French research and technology public organisation, with activities in four main areas: energy, information technologies and healthcare technologies, defence and security. Within CEA, the Laboratory for Electronics & Information Technology (CEA-Leti) works with companies in order to increase their competitiveness through technological innovation and transfers. CEA-Leti is focused on micro and nanotechnologies and their applications, from wireless devices and systems, to biology and healthcare or photonics.

Nanoelectronics and microsystems (MEMS) are at the core of its activities. As a major player in MINATEC excellence center, CEA-Leti operates 8,000-m² state-of-the-art clean rooms, on 24/7 mode, on 200mm and 300mm wafer standards. With 1,200 employees, CEA-Leti trains more than 150 Ph.D. students and hosts 200 assignees from partner companies. Strongly committed to the creation of value for the industry, CEA-Leti puts a strong emphasis on intellectual property and owns more than 1,400 patent families. In 2008, contractual income covered more than 75 percent of its budget worth 205 M€.

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